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ABSTRACT

The Internal/External (I/E) Frame of Reference Model and the structure of students' self-concept in various academic subjects were examined using 195 Grade 10 Chinese students in Hong Kong. Results of structural equation analyses supported the following: (1) the distinction between Chinese and English as two independent academic subjects (rather than as a single language subject); (2) the multi-faceted nature of self-concept and academic performance (three subjects rather than a single construct); (3) self-concept of academic subjects as basically uncorrelated factors, whereas respective achievement as substantially correlated factors; (4) strong relationships between academic performance and self-concept of matching subject; and (5) moderate negative relationships between performance and self-concept of non-matching subjects. The applicability of the I/E Model was generally substantiated. A table demonstrating goodness of fit of various models and a model illustrating relationship of self-concept to achievement are included. (Author/LSR)

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Self-Concept of Chinese Students:

Frame of Reference and Subject Specificity

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Abstract

Marsh's (1986) internal/external (I/E) frame of reference model and the structure of students' self-concept in various academic subjects were examined with 195 Grade 10 Chinese students in Hong Kong. Results of strucutural equation analyses supported: (i) the distinction between Chinese and English as two independent academic subjects (rather than as a single language subject), (ii) the multifaceted nature of self-concept and academic performance (three subjects rather than a single construct), (iii) self-concept of academic subjects as basically uncorrelated factors whereas respective achievement as substantially correlated factors; (iv) strong relationships between academic performance and self-concept of matching subject, (v) moderate negative relationships between performance and self-concept of non-matching subjects. The applicability of Marsh I/E model was generally substantiated.

Self-Concept of Chinese Students:

Frame of Reference and Subject Specificity

High self-concept has been valued as a desirable outcome as well as an important mediator in enhancing other positive psychological or academic achievement (see review Marsh, 1993). In the present study, Marsh's internal/external (I/E) frame of reference model and the structure of students' self-concept in various academic subjects were examined with Chinese students in Hong Kong.

Despite an expectation of strong positive relation between self-concept and academic achievement, empirical support prior to 1980's was typically weak (e.g., r =.2 to .4; Hansford & Hattie, 1982; Wylie, 1979). Recently much stronger relationships (r =.45 to .70) were found between self-concept and achievement of matching subject areas (e.g., between science self-concept and science achievement; Marsh, 1992; Skaalvik & Rankin, 1990, 1995). More and more evidences (Marsh, Walker & Debus, 1991) have demonstrated the need to consider the multiple dimensional nature of academic self-concept in their relationships with other variables.

Though academic achievements in verbal and numerical areas are generally strongly correlated (.5 to .8), self-concept of the respective domains are typical nearly uncorrelated. This has been explained by Marsh's I/E frame of reference model. He postulates that students compare their verbal ability against that of other students (external comparison) as well as against their own numerical ability (or other abilities, internal comparison). The former comparison leads to a positive relation between verbal and numerical self-concepts whereas the latter implies a negative relation. The joint effects, as demonstrated in studies in Australia, Canada, and the USA, are: (i) strong positive path from verbal ability to verbal self-concept (same for numerical

ability), (ii) weak negative path from verbal ability to numerical self-concept (cross-subject relation), and (iii) closed to zero relation between verbal and numerical self-concepts (Marsh, 1991).

There seems to be some evidences suggesting that Chinese students attributed their examination results more to effort than to ability and that they concentrated on own improvement than on comparison with other students as determinants of academic achievement (Hau & Salili, 1991, in press). Depending on the relative emphasis of internal and external comparison, it is possible that the specific relations mentioned above in the I/E model may be substantively affected.

The present study would illuminate on the applicability of the I/E model with Chinese students. Furthermore, the issue of whether Chinese and English language formed a single language ability or as two independent language abilities would be examined with structural equation techniques (Joreskog & Sorbom, 1993).

Method

Sample

The sample consisted of 195 Grade 10 Chinese students (76 boys and 119 girls) in Hong Kong. They were of average academic standard as compared to the Hong Kong student population and came from families of middle to lower-middle socio-economic classes.

Instrument and procedure

Chinese, English, Mathematics Performance. Students' performance in two recent tests on each of these three academic subjects were collected. These three subjects were chosen because of their great importance in the Hong Kong curriculum

Self-Concept. Students self-concept was measured by three sets of 7 items adapted from Marsh's Self-Description Questionnaire (e.g., 'I am interested in mathematics'). Students were asked to rate on 9-point scales from 'strongly disagree' (1) to 'strongly agree' (9).

Results and Conclusion

Structural equation modeling (LISREL version 8, Joreskog & Sorbom, 1993) was the main statistical technique in the following analyses with the correlation matrix among the 27 variables (2 performance indicators + 7 self-concept items for each academic subject) as the input information.

Structure of Three Academic Subjects

We examined the structure of the three subjects to see whether Chinese and English should be conceptualized as two independent subjects or as a single construct. Specifically we fit the 21 self-concept indicators with a three-factor congeneric model (M1A) with all factors being freely correlated among one another. This was compared with another two-factor model (M2A) in which Chinese and English self-concept items were combined into one factor. As recommended by various researchers (e.g., Marsh, Balla, & Hau, in press), goodness of fit was evaluated by χ^2, RNI, and TLI. Another set of analyses was performed on the six academic performance indicators (see M3A to M4B).

A number of model pairs were compared: M1A versus (vs.) M2A, M1B vs. M2B, M4A vs. M5A, and M4B vs. M5B. All comparisons showed that the fit substantially improved in going from the two-factor to the three-factor model. The superiority of the three factor model suggested that Chinese and English self-concepts (or abilities) should best be described as two separate entities rather than as a single construct.

The notion whether these factors were correlated or not was also evaluated. For self-concept, the fits of M1A versus M1B (or M2A vs. M2B) did not differ substantially, $\Delta\chi^2(3) = 4.4$, ΔRNI=0.0, ΔTLI= 0.01. Using the rule of parsimony, this indicated that the three self-concept factors were not considerably correlated. However, similar comparisons of the achievement models showed that the uncorrelated models were substantially worse that the correlated ones; M4B worse than M4A, $\Delta\chi^2(6) = 110$, ΔRNI=0.13, ΔTLI= 0.12. This suggested that correlations among achievement factors were considerable.

Relations between Achievement and Self-Concept

In M7A (see Figure 1), it was noted that achievement factors had strong direct effects on matching self-concept factors (mean beta=.80). Furthermore, the negative moderate paths from achievement to non-matching self-concept lent clear support to the I/E model (mean beta= -.45). M7B was obtained by deleting paths from achievement to self-concept of non-matching domains. The fit dropped drastically and thus supported the substantial relationships between achievement and self-concept in non-matching subjects; $\Delta\chi^2(6) = 252$, ΔRNI=0.06, ΔTLI= 0.05.

In M8A, it was posited that the relation between achievement and self-concept could be explained through the correlation between two latent constructs formed from achievement and self-concept items respectively. A comparison of this model with M7A showed that a multifaceted (3 factors) rather than a unidimensional structure was more appropriate to account for the relationships between self-concept and achievement. If there were strong relations between self-concept and achievement indicators of matching subjects, it is possible that the interrelationships could be represented with a model with three latent subject factors (Chinese,

English, Maths). The model was posited as M9A and was found to have poor fit as compared with M7A.

In sum, the above analyses showed support to: (i) the distinction between Chinese and English as two independent academic subjects (rather than as a single language subject), (ii) the multifaceted nature of self-concept and academic performance (three subjects rather than a single construct), (iii) self-concept of different academic subjects as basically uncorrelated factors whereas achievement in various subjects as substantially correlated factors; (iv) strong relationships between academic performance and self-concept of matching subject, (v) moderate negative relationships between performance and self-concept of non-matching subjects. The applicability of Marsh I/E model was generally substantiated.

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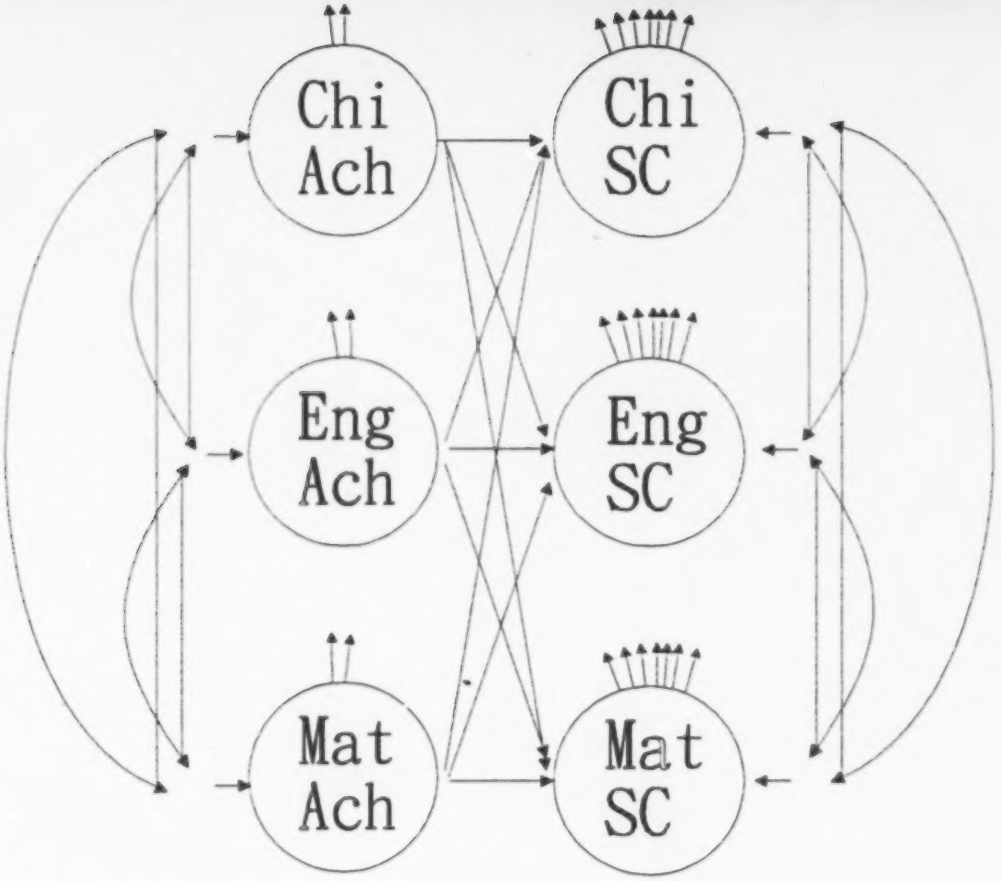
Table 1

Goodness of Fit of various Models

Model		χ(df)	TLI	RNI
Self-Concept Items only				
M1A	3 congeneric factors [Chi, Eng, Mat], factors correlated	497(183)	.89	.91
M1B	M1A, but factors uncorrelated	512(186)	.89	.90
M2A	2 congeneric factors [Lang(Chi+Eng), Mat], correlated	1146(185)	.67	.71
M2B	M2A, but factors uncorrelated	1153(186)	.67	.71
M3A	1 factor	2185(186)	.32	.40
Performance (Test) Items only				
M4A	3 congeneric factors, factors correlated	27(6)	.94	.97
M4B	M4A, but factors uncorrelated	137(12)	.81	.85
M5A	2 congeneric factors [Lang, Mat], correlated	172(8)	.63	.80
M5B	M5A, but factors uncorrelated	262(10)	.55	.70
M6A	1 factor	380(9)	.26	.55
Performance and Self-Concept Items together				
M7A	3 achievement correlated factors (M4A), each has direct effect on 3 correlated self-concept factors (M1A)	661(306)	.91	.92
M7B	M7A, but achievement to matching self-concept factors only	913(312)	.85	.87
M8A	achievement items form 1 factor, self-concept items form 1 factor, the two factors correlated	3550(323)	.22	.29
M9A	achievement and self-concept items of math form 1 factor, so are Eng and Chinese items, the three factors are correlated	1653(318)	.67	.70
M10A	a second-order factor of 3 achievement factors, another second-order factor of 3 self-concept factors, two second-order factors correlated	nonconverged		

Note. Among the 7 self-concept items, two are semantically similar, their correlated uniquenesses were allowed to be correlated. To solve the problem of indeterminacy in two-indicator uncorrelated factor models (e.g., M4B), item uniquenesses were fixed using reliability information from other models.

Chi=Chinese, Eng=English, Mat=Mathematics, Lang (language, i.e., Eng + Chi)



Chi=Chinese, Eng=English, Mat=Maths, Ach=Achievement, SC=Self-concept

Figure 1.

A Priori Model between Achievment and Self-Concept